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EXAMINER

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**BEFORE THE BOARD OF PATENT APPEALS
AND INTERFERENCES**

MAILED

Application Number: 10/760,348
Filing Date: January 21, 2004
Appellant(s): SANKRUTHI, ANAND D.

MAY 21 2007

Technology Center 2100

William T. Ellis
For Appellant

EXAMINER'S ANSWER

This is in response to the appeal brief filed 01/11/07 appealing from the Office action
mailed 08/10/06.

(1) Real Party in Interest

A statement identifying by name the real party in interest is contained in the brief.

(2) Related Appeals and Interferences

The examiner is not aware of any related appeals, interferences, or judicial proceedings which will directly affect or be directly affected by or have a bearing on the Board's decision in the pending appeal.

(3) Status of Claims

The statement of the status of claims contained in the brief is correct.

(4) Status of Amendments After Final

The appellant's statement of the status of amendments after final rejection contained in the brief is correct.

(5) Summary of Claimed Subject Matter

The summary of claimed subject matter contained in the brief is correct.

(6) Grounds of Rejection to be Reviewed on Appeal

The appellant's statement of the grounds of rejection to be reviewed on appeal identifies the ground of rejections and the associated claims under rejection to be reviewed on appeal.

(7) Claims Appendix

The copy of the appealed claims contained in the Appendix to the brief is correct.

(8) Evidence Relied Upon

2003/0023811	Kim et al.	01-30-03
6,611,896	Mason, Jr. et al.	08-26-03

(9) Grounds of Rejection

The following ground(s) of rejection are applicable to the appealed claims:

Claim Rejections - 35 USC § 102

1. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(e) the invention was described in (1) an application for patent, published under section 122(b), by another filed in the United States before the invention by the applicant for patent or (2) a patent granted on an application for patent by another filed in the United States before the invention by the applicant for patent, except that an international application filed under the treaty defined in section 351(a) shall have the effects for purposes of this subsection of an application filed in the United States only if the international application designated the United States and was published under Article 21(2) of such treaty in the English language.

2. Claims 1-8, 13, and 15-16 are rejected under 35 U.S.C. 102(e) as being anticipated by Kim et al., US PG Pub 2003/0023811, hereafter "Kim".

3. With respect to claim 1, Kim teaches a method of determining volume types present on a storage device, the method including the steps of determining superficial specifying characteristics of a volume on the storage device and correlating the superficial specifying characteristics against one or more previously determined volume characteristics thereby inferring a method used for writing data onto the volume, in par. 38 and figs. 3 and 5. It is disclosed in par. 38 that each disk partition contains a metadata table (which is shown in figs 3 and 6). A metadata table is a superficial specifying characteristic. In fig. 5, the RAID level is specified in numeral 98, which is method of writing to the volume.

4. With respect to claim 2, Kim teaches a method as claimed in claim 1, wherein one of the storage device comprises one or more data storage units, in fig. 2 where you can see that each of the disks contain multiple volumes.

5. With respect to claim 3, Kim teaches a method as claimed in claim 2, wherein the one or more data storage units corresponds to a disk or drive and/or is logical or physical, in fig. 2.

6. With respect to claim 4, Kim teaches a method as claimed in claim 3, wherein the storage device comprises a disk, array of disks or similar assembly of partitionable media, in fig. 2.

7. With respect to claim 5, Kim teaches a method as claimed in claim 1, wherein the specifying characteristics include identifying strings embedded in a symbolic name of the volume, in par. 102 and fig. 5.

8. With respect to claim 6, Kim teaches a method as claimed in claim 1, wherein the specifying characteristics further include characteristics related to how the volume is physically arranged in the storage device, in par. 97 and fig. 4.

9. With respect to claim 7, Kim teaches a method as claimed in claim 6, wherein the physical arrangement of the volume on the storage device include criteria corresponding to the size of the storage unit extents of the volume in relation to the actual size of the volume, in par. 102 and fig. 5.

10. With respect claim 8, Kim teaches a method as claimed in claim 1, wherein RAID and striped volume types are identified by corresponding string present in a symbolic volume name, in par. 102 and fig. 5, RAID level 98.

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11. With respect to claim 13, Applicant claims a system that corresponds to the method of claim 1, and is therefore rejected using similar logic.

12. With respect to claim 15, Applicant claims a computer adapted to operate in accordance with claim 1, and is therefore rejected using similar logic.

13. With respect to claim 16, Applicant claims a computer program module embodied on a computer readable medium, adapted to function in accordance with claim 1, and is therefore rejected using similar logic.

Claim Rejections - 35 USC § 103

14. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

15. The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

16. Claim 9 is rejected under 35 U.S.C. 103(a) as being unpatentable over Kim as applied to claims 1-6, 8, 13, and 15-16 above, further in view of Mason, Jr. et al., US Patent 6,611,896.

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17. With respect to claim 9, Kim teaches all other limitations of the parent claim but fails to teach that a mirrored volume type is indicated when the extents of a logical volume are greater than the actual size of the volume. Mason, Jr. et al. teaches that when data is mirrored between two physical devices, the extents of the volume will be greater than the actual size of the volume, in col. 4, lines 42-57, thereby teaching:

a method as claimed in claim 1 wherein, if the volume is not previously identified as a RAID volume, the characteristic of the sum of the storage unit extents occupied by the volume being greater than the actual size of the volume corresponds to a mirrored volume type.

18. It would have been obvious to one of ordinary skill in the art at the time the invention was made, having the teachings of Kim and Mason, Jr. et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Mason, Jr. et al., in order to identify mirrored volumes, thereby allowing optimization of seek times to mirrored volumes, as taught by Mason, Jr. et al. in col. 3, lines 5-20.

19. Claims 10-12 and 14 are rejected under 35 U.S.C. 103(a) as being unpatentable over Kim as applied to claims 1-8, 13, and 15-16 above, further in view of Cabrera et al., US Patent 6,553,387.

20. With respect to claim 10, Kim teaches all other limitations of the parent claim but fails to expressly teach that a simple volume type corresponds to storage unit extents being on the same storage unit. Cabrera et al. teach a method, wherein the

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characteristic of the storage unit extents occupied by the volume being on the same storage unit corresponds to a simple volume type, in col. 8, lines 12-14.

21. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify a simple volume, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

22. With respect to claim 11, Kim teaches all other limitations of the parent claim but fails to expressly teach how storage unit extents correspond to a spanned volume type. Cabrera et al. teaches that a spanned volume type corresponds to the case when the sum of the storage unit extents occupied by a volume are greater than the actual size of the volume and that the storage unit extents occupied by the volume are not on the same storage device, in col. 8, lines 15-21. Note that the concatenation volume type is a synonym for the spanned volume type. Since Kim already taught identification of RAID volume in a previous step, the combination of Kim and Cabrera et al. teaches:

A method as claimed in claim 1, wherein if the volume is not previously identified as a RAID volume, the characteristic of neither the sum of the storage unit extents occupied by the volume being greater than the actual size of the volume nor the storage unit extents occupied by the volume being on the same storage device, corresponds to a spanned volume type.

23. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify concatenated (spanned) volume types, which allows the logical volume manager to indicate in the case of a physical disk failure, whether the remaining disk is capable of handling I/O, as taught by Cabrera et al. in col. 3, lines 39-46.

24. With respect to claim 12, Kim teaches a method of determining the volume types present on a disk, the method including the steps of:

determining if a symbolic name of a volume contains information identifying the volume type as either "raid" or "striped" thereby indicating that the volume type is "raid" or "striped" thereby indicating that the volume type is "raid" or "striped" respectively, in figs. 2-5, par.102, and as discussed above.

Cabrera et al. teach:

determining a size of storage unit extents occupied by the volume and the actual size of the volume, in col. 10, lines 13-16;

determining if the sum of the storage unit extents is greater than the actual size of the volume thereby indicating that the volume type is "mirrored," in col. 8, lines 33-43;

determining if all of the storage unit extents lie on the same storage unit thereby indicating that the volume type is "simple," in col. 8, lines 12-14;

and, determining if all the storage unit extents do not lie on the same storage unit and that the sum of the storage unit extents is not greater than the actual size of the volume, thereby indicating that the volume type is "spanned," in col. 8, lines 15-21.

25. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify different types of volumes, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

26. With respect to claim 14, Kim teaches all other limitations of the parent claim as discussed supra and further teaches a system as claimed in claim 13, wherein the inference step includes extracting the symbolic name of the volume and if it includes the string RAID or striped, correlating that with the RAID and striped volume types respectively, in figs 3-5, par. 102 and as discussed above. Kim fails to teach analyzing the size of the storage unit extents to determine the volume type.

Cabrera et al. teach: otherwise analyzing the size of the storage unit extents occupied by the volume and if the sum of the storage unit extents occupied by the volume and if the sum of the storage unit extents is more than the actual size of the volume correlating that with a mirrored volume type, if the storage unit extents occupied by the volume all reside on the same storage unit, correlating that with a simple volume type and if none of the abovementioned criteria are met, correlating this with a spanned volume type, in col. 10, lines 13-16, col. 8, lines 12-21 and 33-43.

27. It would have been obvious to one of ordinary skill in the art, having the teachings of Kim and Cabrera et al. before him at the time the invention was made, to modify the logical volume management system of Kim with the logical volume management system of Cabrera et al., in order to identify different types of volumes, which allows the logical volume manager to determine the sanity of a drive in case of a hardware failure, as taught by Cabrera et al. in col. 3, lines 34-46.

(10) Response to Arguments

Applicants' arguments have been fully and carefully considered with Examiner's answers set forth below.

Response to Arguments on Independent Claims 1 and 13

Applicant contends that independent claims 1 and 13 are patentable over Kim et al., US Patent Publication No, 2003/0023811 ("Kim"), as allegedly, Kim fails to teach, disclose or suggest correlating the superficial specifying characteristics against one or more previously determined volume characteristics thereby inferring a method used for writing data onto the volume. The examiner disagrees with this argument for the following reasons:

First, in regard to Kim teaching superficial specifying characteristics of a logical volume:

- Kim teaches a metadata table, which includes a logical volume map (pars. 83-84 and fig. 3).

- The logical volume map stores a RAID Level of the volume (par. 102 and fig. 5). This metadata is a superficial specifying characteristic of a logical volume.

The fact that Kim discloses using a Logical Volume Manager to access the superficial specifying characteristics is not pertinent because the claims do not require that the superficial specifying characteristics may not be accessed through a logical volume manager.

Second, as for the limitation “correlating the superficial specifying characteristics against one or more previously determined volume characteristics thereby inferring a method used for writing data onto the volumes,” Kim teaches:

- RAID levels are methods of writing data onto volumes (pars. 2-19).
- There are nine well-known types of RAID, which are listed in pars. 9-19, and may be considered examples of “previously determined volume characteristics.”
- The metadata includes a RAID Level field, which represents the RAID level of the corresponding volume (par. 102 and fig. 5). A RAID level specifies a particular method of writing data to a volume, such as those 9 well-known methods listed in pars. 10-19. If you have determined the RAID level, the method of writing data to the volume is inferred from the corresponding RAID method.

While the RAID level field is read directly, the method of writing to the logical volume is inferred based on the RAID level.

Therefore, the Examiner's position regarding the patentability of claims 1 and 13 remains the same as indicated in the previous Office Action.

Response to Argument on Independent Claims 12

Applicant contends that independent claim 12 is patentable over Kim in combination with Cabrera et al. (US Patent No. 6,553,387), as allegedly, Kim fails to teach, disclose or suggest "identifying the volume type as either "raid" or "striped." The examiner disagrees with this argument for the following reasons:

Kim teaches:

- a logical volume map in par. 102 and fig. 5. The examiner is treating this logical volume map as "the symbolic name" of the present claim 12.
- The logical volume map contains a RAID level field 98, which identifies the RAID level of the corresponding logical volume (par. 102).
- Some RAID levels use striping, such as RAID level 2 (par. 12). If the RAID level field indicates the level as 2, the volume type had been identified as striped.
- Other RAID levels do not use striping, such as RAID level 1 (par. 11). If the RAID level field indicates the level as 1, the volume type has been identified as RAID.

Accordingly, since the symbolic name contains the RAID level field, the symbolic name contains information identifying the volume type as either "raid" or "striped" thereby indicating that the volume is "raid" or "striped," since, as has been shown, the RAID level field identifies the volume as either "raid" or "striped"

Therefore, the Examiner's position regarding the patentability of claim 12 remains the same as indicated in the previous Office Action.

Response to Arguments on Dependent Claims 2-11 and 14-16

Applicant contends that dependent claims 2-11 and 14-16 are patentable over Kim by virtue of inheriting the limitations of independent claims 1 and 13. The Examiner disagrees.

As established in the section of "**Response to Arguments on Independent claims 1 and 13**," the allegation that Kim fails to disclose a method for correlating the superficial specifying characteristics against one or more previously determined volume characteristics thereby inferring a method use for writing data onto the volume is false.

Further the reason why each of the dependent claims 2-11 and 14-16 is rejected has been provided in section (9) of this Office Action (i.e., **(9) Grounds of Rejection**).

Therefore, the Examiner's position regarding the patentability of claims 2-11 and 14-16 remains the same as indicated in the previous Office Action.

(11) Related Proceeding(s) Appendix

None.

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